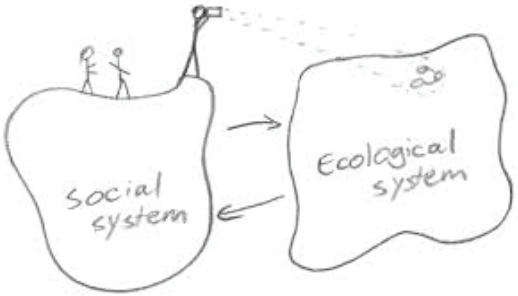
Apr 30th, 1:30 PM - 3:00 PM

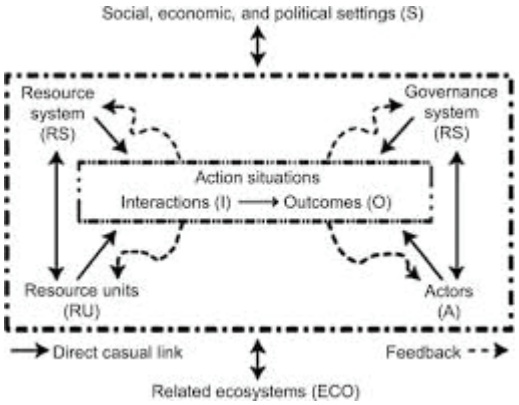
Integrating the Natural and Social Sciences: An Introduction

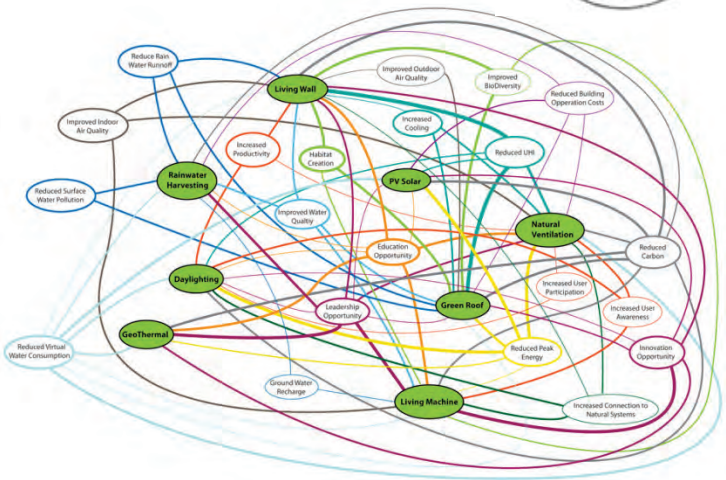
Sara J. Breslow
United States. National Oceanic and Atmospheric Administration, sarajo@uw.edu

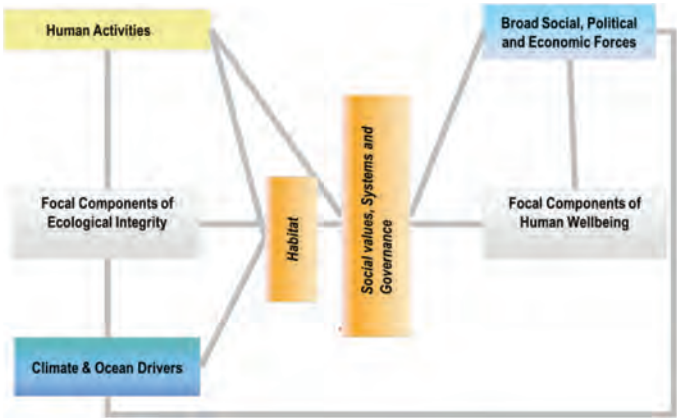
Integrating the Natural & Social Sciences in Environmental Research: An Introduction

Sara Jo Breslow
Northwest Fisheries Science Center
Salish Sea Ecosystem Conference
Seattle, Washington
April 30, 2014

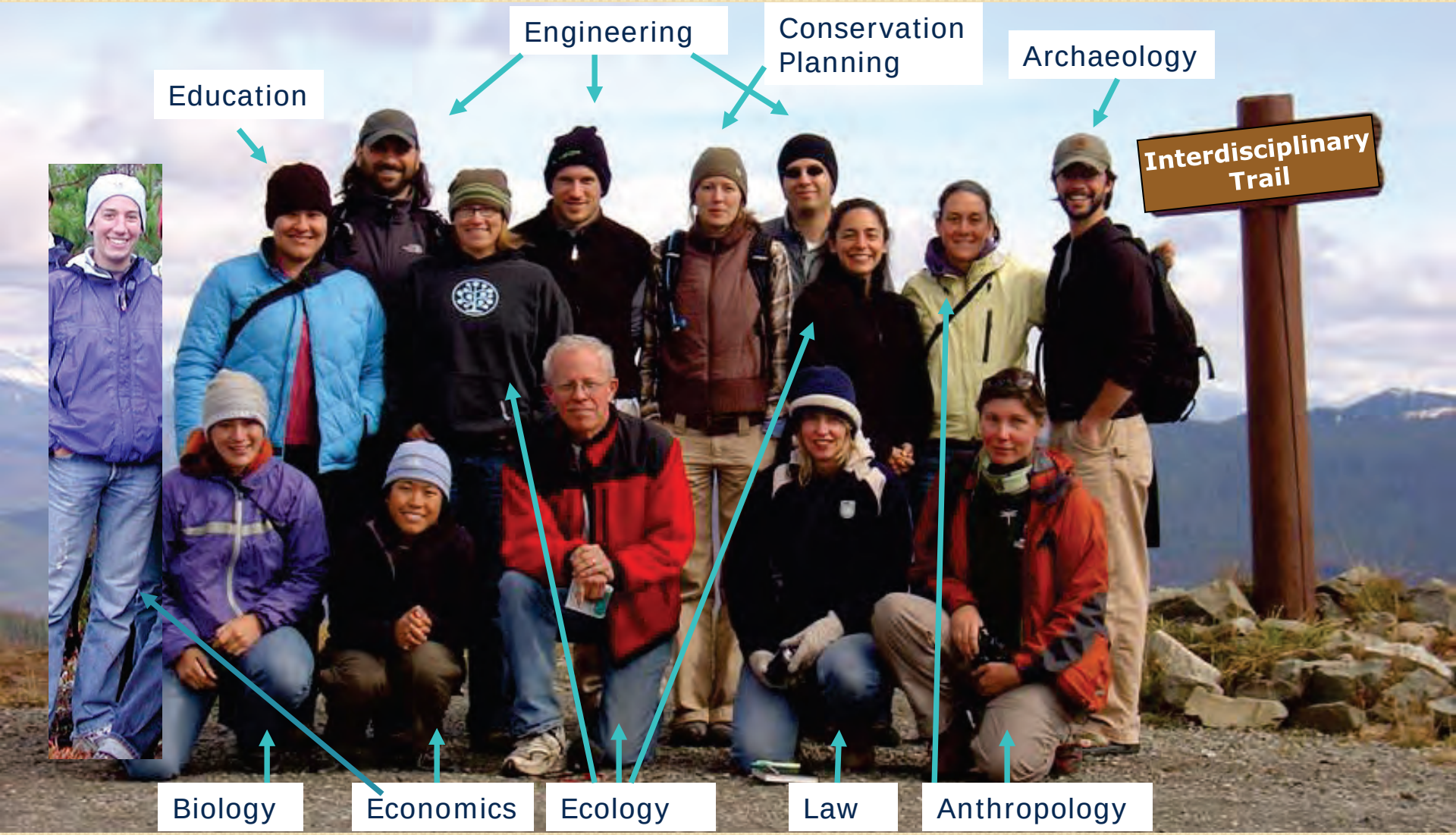








University of Washington, 2006-2007
Multinational Collaborations on Challenges to the Environment (MCCE)
NSF Integrated Graduate Education and Research Traineeship (IGERT)



Skills & Strategies for Engaging in Interdisciplinary Collaborations

1. Invest in interpersonal relationships
2. Learn from people who have done it
3. Read the interdisciplinary literature
4. Build a shared language
5. Compare philosophies, methods, & cultures
6. Read, travel, & work in other disciplines
7. Cultivate certain attitudes

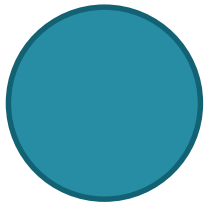
Our Orientation Field Trip – WA-BC Border

2. Learn from people who have done it

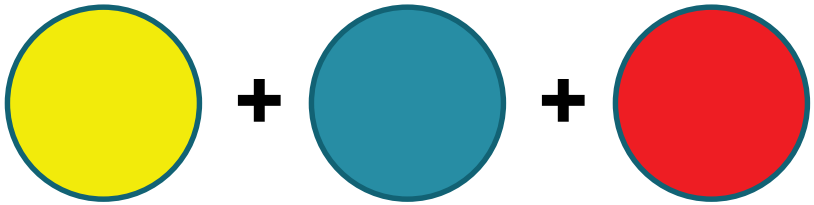
Interdisciplinary & International Team Panels

Panels	Projects and Teams
Academic Research	▪ Impacts of El Niño-Southern oscillation events on Chinese rice production and the world rice market ▪ Kuril biocomplexity project: human vulnerability and resilience to subarctic change
Academic Research	▪ AmeriFlux Network: collecting carbon data from across North America ▪ Governance feasibility of marine ecosystem-based management
UW IGERTs	▪ Bioresource-based fuels for sustainable societies ▪ Urban ecology
Non-Academic Management	▪ Environmental compliance of US military bases in Europe ▪ Pacific Marine Stewardship Council ▪ Puget Sound-Georgia Basin ecosystem indicators workgroup

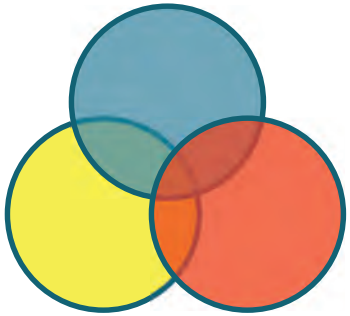
Types of Cross-Disciplinarity



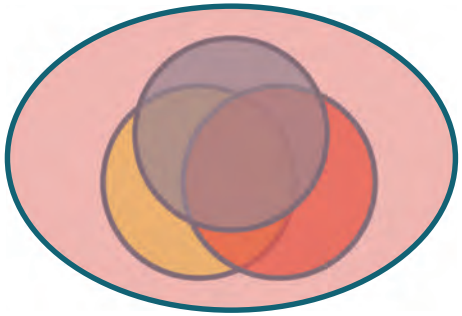
Disciplinary



Multidisciplinary



Interdisciplinary



Transdisciplinary

4. Build a Shared Language

Our Wiki-"Jargon Board"

- Advocacy
- Agency
- Bayesian
- Bias
- Biology
- Biophysical
- Culture
- Deductive
- Environment
- Epistemology
- Ethics
- Ethnography
- Fact
- Hypothesis
- Hypothetico-deductive
- Ideas
- Ideational
- Induction
- Interpretation
- Knowledge
- Landscape
- Likelihood
- Material
- Method
- Methodology
- Modeling
- Modernity
- Narrative
- Nature
- Objectivity
- Phenomenology
- Positivism
- Postmodernism
- Post-processual
- Post-structuralism
- Probability
- Processual
- Qualitative
- Quantitative
- Reality
- Reliability
- Replicability
- Research
- Science
- Significance (statistical vs. biological)
- Social theory
- Society
- Structuralism
- Subjectivity
- Theory
- Truth
- Uncertainty
- Validity
- Values

5. Compare Philosophies, Methods, & Norms

Our "Philosophical Toolbox"

→ http://www.cals.uidaho.edu/

	Engineering	Ecology	Economics	Anthropology
Methods of data collection & analysis?	Lab experiments Field observation Quantitative simulation Modeling	Lab experiments Field observation Modeling Statistics Qualitative	Modeling Game Theory Existing data Surveys	← All that, plus: Ethnography Interviews Literary theory Historical analysis
What counts as valid evidence?	Reproducibility Standard measurements	Reproducibility Random samples Accurate model assumptions	Reproducibility Price, factor, production data Choice set selection	Internal debates on this question: Statistical to ethnographic
Interaction with decision-making?	Proposes and implements technological solutions	Informs about natural world through action & publishing	Directly inform, or remain outside normative arena	Provide evol. scale, molecular, sociocultural contexts
Interaction with local people?	Local applications & involvement or avoid entirely	Some collaborate with locals; others very little	Usually none, unless in-person survey	Participant-observer in local community for 1+ years

6. Read, Travel & Work in Other Disciplines

New Zealand & China Team Trips

7. Cultivate certain attitudes

Ways to be an Interdisciplinarian

- Go beyond logic & use your creative imagination
- Question yourself & your discipline
- Practice comfort with ambiguity & dissonance
- Accept gaps & inconsistencies
- Suspend alarm at the unfamiliar
- Genuinely respect other disciplines
- Seek out limitations & potential contributions of all disciplines


“experts with handles”

What can Interdisciplinarity do for the Salish Sea?

- Address collective problems & ask more complex questions
- Avoid exacerbating problems with too narrow problem framing
- Increase robustness and richness of results through mixed methods
- Identify where solutions may be most effective – e.g. technical, policy, cultural
- Understand how environmental research affects decision-making, *as well as local people & environments*
- Involve local people & build social capacity for local problem-solving

A Huge Thank You to:

- Emma Flores (Education) – TA, MCCE IGERT Class
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- MCCE Cohort 3 Students
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- All of our collaborators and interlocutors in New Zealand, China, Washington State, and British Columbia

- The University of Washington
- The National Science Foundation

Some Suggestions for Further Reading

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